

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: **R. Singh, et al.**

Examiner: **A. Khan**

Application No.: **10/694,273 (Conf. 2796)**

Group Art Unit: **1711**

Filed: **October 27, 2003**

Docket No.: **H0003965-4510**

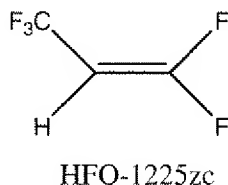
Title: **COMPOSITIONS CONTAINING FLUORINE SUBSTITUTED OLEFINS**

Commissioner for Patents
Alexandria, VA 22313-1450

RULE 132 DECLARATION OF DR. GEORGE RUSCH

I, Dr. George Rusch, declare and state that:

1. I am the Director of Toxicology and Risk Assessment at Honeywell International Inc. ("Honeywell"). I hold a Ph.D. degree in Chemistry from Adelphi University, in Garden City, NY. I have been employed by Honeywell and/or its predecessor in interest, the assignee of the application, since about August, 1980 holding various positions, including my current position as Director of Toxicology and Risk Assessment.
2. Toxicological testing of HFO-1225zc (1,1,3,3,3-pentafluoropropene)



is described in the U.S. Department of Commerce, National Technical Information Service publication entitled "Support: Letter from Dupont Haskell Lab to US EPA Regarding Results of Bacterial Reverse Mutation Assay Conducted with 1-Propene, 1,1,3,3,3-Pentafluoro-, dated 04/17/00" (Exhibit "A"). The toxicity tests were conducted by standard methods known to those of ordinary skill in the art. In particular, the

methods involve determining the LC₅₀ or median lethal concentration required to kill half the members of a tested population. The protocol used for this LC₅₀ study consisted of a series of separate 4-hour exposures of groups of rats to the test compound. The animals are observed for mortality that may occur during the exposure or within the 14 day post-exposure observation period. Results of this test are reported in Table 1 below.

Table 1

Parameter	HFO 1225zc
Concentration (ppm)	2,000
Initial Population Size (rats)	10
Population Deaths during Exposure	0
Population Deaths after Exposure	6
Population Survival	4
LC ₅₀ (ppm)	Less than 2,000*

*At 2000 ppm, more than half (6/10) of the rats died.

3. I have tested and/or supervised the toxicological testing of HFO-1234yf (2,3,3,3-tetrafluoropropene)



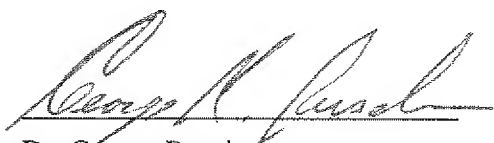
The HFO-1234yf testing done under my supervision used substantially the same methods used to produce the results described in connection with the published testing of HFO-1225zc described above, except that a greater initial population was used in testing HFO-1225zc. Honeywell uses small population sizes in toxicity testing where possible to minimize the use of animals in its testing programs. Results of the HFO-1234yf testing that we did, and which we believe to be reliable and representative of results comparable to the test results reported in Exhibit A, are reported in Tables 2 and 3 below.

Table 2

Parameter	HFO-1234yf
Concentration (ppm)	400,000
Initial Population Size (rats)	3 per group
Population Deaths during Exposure	0/0
Population Deaths after Exposure	0/0
Population Survival	3 per group
LC ₅₀ (ppm)	More than 400,000

4. The results in Table 2 illustrate that HFO-1234yf is far less toxic than HFO-1225zc. In particular, this information evidences that HFO-1234yf has a toxicity, as measured by LC₅₀, at least approximately 200 times less than HFO-1225zc.

6. I hereby declare that all statements made herein of my knowledge are true and that all statements made on information and belief are believed to be true and further that the statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under §1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.


Dr. George Rusch

October 15, 2007
Date